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LIFE HISTORY STUDIES ON MEXICAN BUTTERFLIES

I. NOTES ON THE EARLY STAGES OF FOUR PAPILIONIDS FROM CATEMACO, VERACRUZ

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DURING THE SUMMER OF 1962, while engaged in collecting butterflies near Catemaco in the Tuxtla Mountains of southern Veracruz, Mexico, I was able to rear the immature stages of four species of the family Papilionidae: *Graphium belesis* (Bates), *G. epidaus epidaus* (Doubleday, Westwood & Hewitson), *Papilio androgeus epidaurus* Godman & Salvin, and *P. anchisiades idaeus* Fabricius. References to the immature stages of these are scanty and not readily available. Recent illustrative works, therefore, are of interest and benefit to students of the Lepidoptera.

Scale lines in all photographs represent .5 inch or 127 millimeters. All measurements are based on living material.

GRAPHIUM BELESIS Bates

The only reference made to the immature stages of this butterfly, to my knowledge, is a brief description of a mature larva (Dyar, 1912). The present photographs represent the first published illustrative material.

EGG. (Description based on 2 eggs.) Duration of stage, 4 days (74°-90° F. ambient temperature). The egg is a sphere having a diameter of 1.0 mm. and being light yellow in color. Superficially, it appears perfectly smooth but upon close examination, tiny facets or reticulations could be discerned. Eggs are attached to the undersurfaces of the leaves of *Annona muricata* L. (Annonaceae) called "Guanabana" by the local residents. A related species, *A. reticulata*, grew in the same vicinity, but females never seemed to be attracted to it.

FIRST INSTAR LARVA: Fig. 2A. (Measurements based upon one larva.) Beginning of stadium-length, 1.7 mm.; greatest width, 1.0 mm.; head diameter, .9 mm.

Head black with tiny, fine setae.

Body expanded anteriorly into a "false head"; color velvety black with a white transverse band (saddle) on sections of fourth and fifth abdominal segments. Legs and prolegs concolorous with body. Osmateria yellow-orange in color.

Second instar larvae similar.

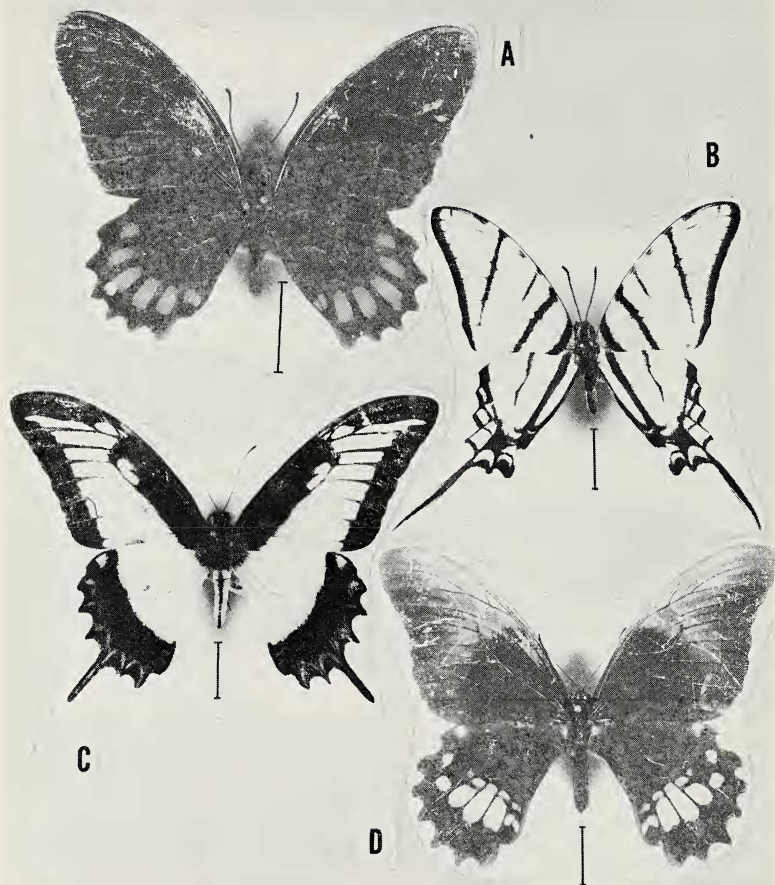


Fig. 1. Adults. A. *Graphium belesis* (Bates). B. *Graphium epidaus epidaus* (Doubl., Westw. & Hew.). C. *Papilio androgeus epidaurus* God. & Sal. D. *Papilio anchisiades idaeus* Fabr. Photographs by J. H. Roberts.

LAST INSTAR LARVA: Figs. 2B & C. (Measurements based on two specimens.) Beginning of stadium-length, 21.1-21.4 mm.; width, 9.0-9.2 mm.; head diameter, 4.1 mm. Termination of stadium-length, 32.1-34.2 mm.; width, 10.9-12.0 mm.

Head as before.

Body with anterior portion slightly less expanded than before. Color black with an irregular transverse white band (saddle) occupying major portions of fourth and fifth abdominal segments dorsally but only fifth segment laterally. Segments with longitudinal rows of smooth, dull red, paired tubercles: first and second thoracic segments with 1 lateral and 1 suprastigmatal pair; third thoracic and all abdominal segments with 1 subdorsal, 1 lateral, and 1 suprastigmatal pair. Legs and prolegs as before. Osmateria more orange.

PUPA: Figs. 4A & B. (Measurements based on one specimen.) Length, 20.0 mm.; greatest width, 11.1 mm. Duration of stage, 13 days.

The pupa of this species represents quite an interesting form (figs. 4A & B). Color a light, uniform green (slightly lighter on the "belly" portion). Four longitudinal rows of tubercles, also light green but slightly darker than the surrounding areas. Head portion with a ventral projection or "snout" 5.0 mm. in length. Girdle around constricted thoracic portion.

Adults (fig. 1A) were numerous around the edges of the secondary forests bordering Laguna Catemaco. The range of this species according to Hoffman (1940) is the warm regions of the eastern Sierra, Chiapas, and the southern and western Sierra as far as Colima and Jalisco.

GRAPHIUM EPIDAUS EPIDAUS (Doubleday, Westwood & Hewitson)

Immature stages (second and sixth instars and pupae) of the western subspecies *tepicus* Rothschild & Jordan, have been pictured by Comstock & Vazquez (1960). I observed no significant deviation from their illustrations in the eastern subspecies *epidaus*. However, I include it here because of the taxonomic difference and because of a difference in duration of the pupal stage.

EGG. (Comparisons based on 5 eggs.) Eggs are attached to the undersurfaces of the leaves of *Annona reticulata* L. (Annonaceae). As with *G. belesis*, females never were seen to oviposit on the related *A. muricata*.

LARVA. (Comparisons based on 11 larvae.) All instar larvae showed no deviation from the descriptions of Comstock & Vazquez (1960) for *tepicus*. A fifth instar larva is pictured in figures 3A & B.

PUPA. Figs. 4C & D. (Measurements based on 4 specimens.) Length, 26.1-26.5 mm.; greatest width, 10.3-10.6 mm. Duration of stage, 201 days. No deviation from *tepicus* was apparent. However, duration of pupal stage is quite different. Comstock & Vazquez state that the adults of *tepicus* emerged nine days after pupation whereas four *epidaus* imagos reared did not emerge from the chrysalids for 201 days. It should be mentioned here that my *epidaus* larvae pupated during early August, almost the exact time as the *tepicus* larvae of Comstock & Vazquez. However, these chrysalids were under natural (field) conditions for only 3½ months of the total time since I departed Mexico in early December of the same year and carried the pupae with me back to Louisiana. Then on a morning late in March, after having been exposed to laboratory conditions (about 28°C.) for nearly 3 months, 3 adults emerged. The following day, the fourth adult emerged. It seems reasonable to conclude that the larvae which I reared were representatives of the final brood of the year (after late August, no adults were seen in the field). It is likely that the eastern subspecies *epidaus* found in Veracruz undergoes a pupal diapause through the period of heaviest rains (September-January) and emerges as an adult after drier weather begins (February or March). To be sure, half of the time my pupae were under artificial conditions. However, I believe that the 3½ month diapause under natural, field conditions is justification for the above suggestion. Since Comstock & Vazquez did not report any diapause in *tepicus*, I assume that it either undergoes no diapause or else diapause begins at a later date than mid or late August.

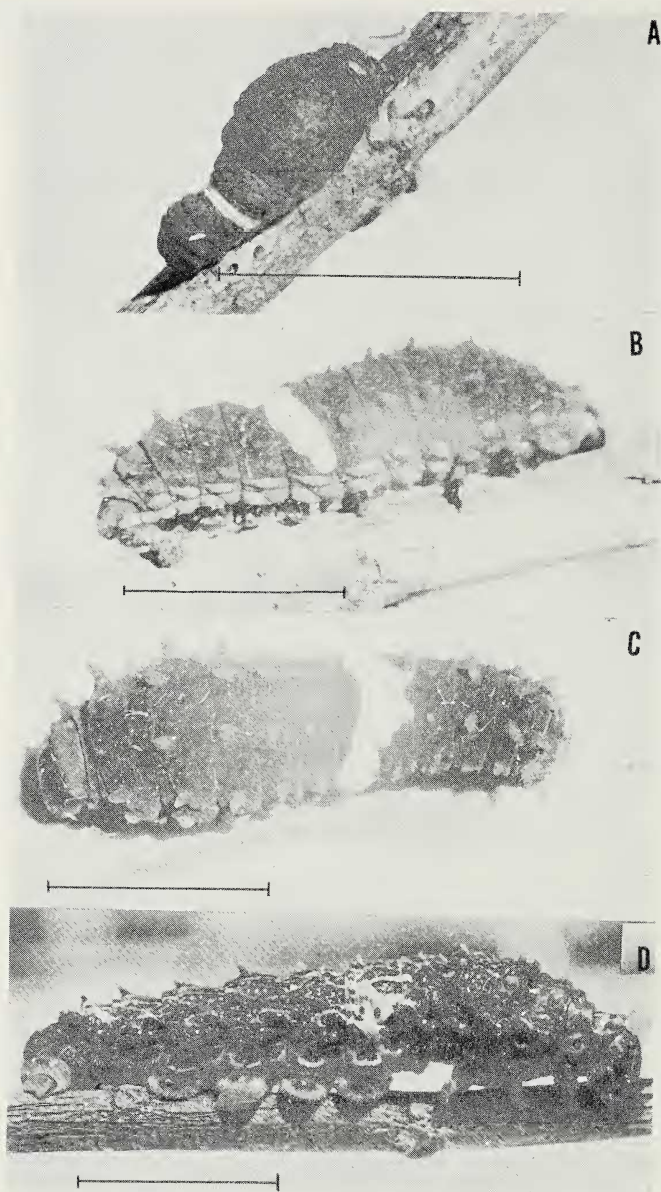


Fig. 2. Larvae. A. *G. belesis*, first instar. B. *G. belesis* last instar (lateral view). C. *G. belesis*, last instar (dorsal view). D. *P. anchisiades idaeus*, last instar. Photographs by R. F. Andrie.

Adults (fig. 1B) were fairly abundant in the general vicinity of the town of Catemaco during the months of April-August. After August, no individuals were observed. The range of the nominate species (Hoffman, 1940) is Veracruz, Tabasco, northern Chiapas, Campeche, and Yucatan.

PAPILIO ANDROGEUS EPIDAURUS Godman & Salvin

Four authors, Merian (1705), Moss (1919), Sepp (1855), and Burmeister (1879) have mentioned the immature stages of this species.

SECOND INSTAR LARVA (probably). Fig. 3C. (Measurements based on 3 specimens.) Beginning of stadium-length, 7.2-7.6 mm.; greatest width, 1.5-1.6 mm.; head diameter, 1.3 mm. Termination of stadium-length, 16.1-16.7 mm.; width, 3.2-3.4 mm. Duration, 5 days.

Head tan with numerous tiny, fine setae.

Body expanded anteriorly into a false head. Segments with rows of paired bristly tubercles: first thoracic segment with 1 reduced subdorsal, 1 prominent supralateral, and 2 less prominent pairs (1 lateral and 1 sublateral); second third thoracic segments similar but with supralateral pair reduced; abdominal segments as above but with lateral and sublateral pairs nearly indistinguishable. Color glossy tan-brown with a slight cream mottling; also, a cream colored saddle on the third and fourth abdominal segments, and an extensive creamy area on the last three segments. Legs and prolegs tan. Osmateria light orange.

LAST INSTAR LARVA. Fig. 3D. (Measurements based on 3 specimens.) Beginning of stadium-length, 41.1-43.5 mm.; width, 6.9-7.9 mm.; head diameter, 3.9 mm. Termination of stadium-length, 74.0-75.9 mm.; width, 19.1-19.7 mm.

Head as before.

Tubercles on all segments reduced to slight knobs with basal crescent shaped blue markings. Ground color dark grey to black; numerous white streaks and blotches (the latter being particularly extensive on the lateral sections of all thoracic segments and second-fourth and seventh-ninth abdominal segments). Legs and prolegs dark brown. Osmateria orange.

PUPA. Fig. 5B. (Measurements based on 3 specimens.) Length, 42.1-42.6 mm.; greatest width, 7.2-7.3 mm. Duration of stage, 51 days (only 1 adult emerged, the 2 other pupae having died).

Color dark brown with creamy, longitudinal lines and bands; also, a slight green shading on the wing cases. Head portion with three horn-like projections directed anteriorly. Girdle around non-constricted thoracic section.

Larvae were found resting on the upper surfaces of the leaves of *Zanthoxylum elephantiasis* Macf. (Rutaceae). To my knowledge, this is the first mention of this tree being the larval food plant of *P. androgeus*.

Adults (fig. 1C) were not common in the Tuxtlas. Only two individuals were seen and captured around the lake where the food plant was abundant along the margins of fields; two individuals were seen "hill-topping" above the peak of Volcán San Martín (5400 ft.) and one individual was seen engaged in the same activity above the peak of Cerro Tuxtla (2700 ft.).

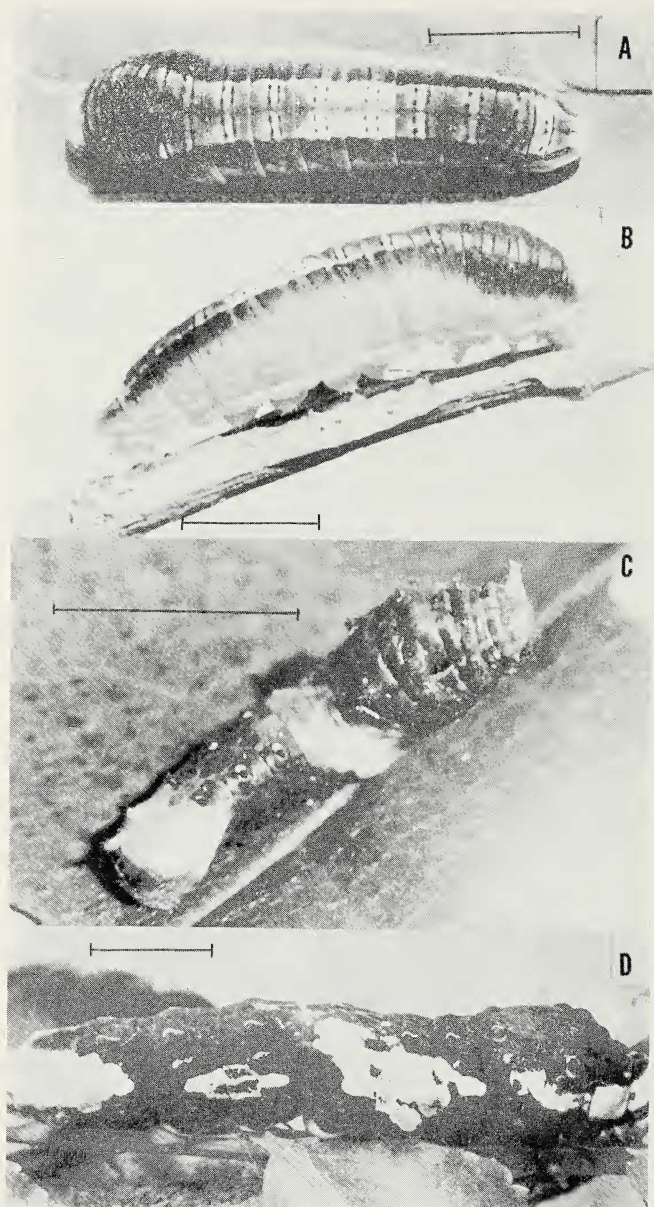


Fig. 3. Larvae. A. *G. e. epidaus*, fifth instar (dorsal view). B. *G. e. epidaus*, fifth instar (lateral view). C. *P. androgeus epidaurus*, second instar. D. *P. androgeus epidaurus*, last instar. Photographs by R. F. Andrie.

The range of the species (Hoffman, 1940) is southern Tamaulipas southward and the western Sierra as far as Sinaloa and Durango.

PAPILIO ANCHISIADES IDAEUS Fabricius

The stages of *P. anchisiades* are probably the best known of any of the four species under consideration here. This is probably due, in part, to its wide distribution (see below). Bates (1861), Caracciolo (1891), Dewitz (1886), Jones (1883), Moss (1919) and Stoll (1781) have mentioned the various stages in the life history of this insect.

LAST INSTAR LARVA. Fig. 2D. (Measurements based on 5 larvae.) Beginning of stadium-length, 27.0-27.8 mm.; width, 6.1-6.8 mm.; head diameter, 3.9 mm. Termination of stadium-length, 42.2-43.9 mm.; width, 7.0-7.2 mm. Duration, 8 days.

Head medium brown with tiny tubercles and setae.

Body more or less cylindrical, only slightly expanded anteriorly. Segments with pairs of subdorsal, supralateral and lateral tubercles (as described under *P. androgeus*) bare and concolorous with ground color. Color greenish brown with numerous streaks, lines and flecks of white or cream. Legs and prolegs brown. Osmateria yellow.

Larvae are nocturnal feeders on lime (*Citrus sp.*). During the daylight hours they rest together in groups on the trunk or stems of the food plant.

PUPA. Fig. 5A. (Measurements based on 3 specimens.) Length, 34.1-35.0 mm.; greatest width, 10.2-10.4 mm. Duration of stage, 13 days.

Color light brown with light green mottling beginning on wing cases and terminating at cremaster, giving the chrysalid the appearance of having a lichen encrustation. Slight dorsal protrusion anteriorly. Tubercles still evident. Girdle around non-constricted thoracic portion.

Adults (fig. 1D) were common around the citrus groves bordering Laguna Catemaco. According to Hoffman (1940) the range of the species is the entire eastern area of Mexico. Ehrlich & Ehrlich (1961) list the range as "southern Brazil to Mexico and southern Texas."

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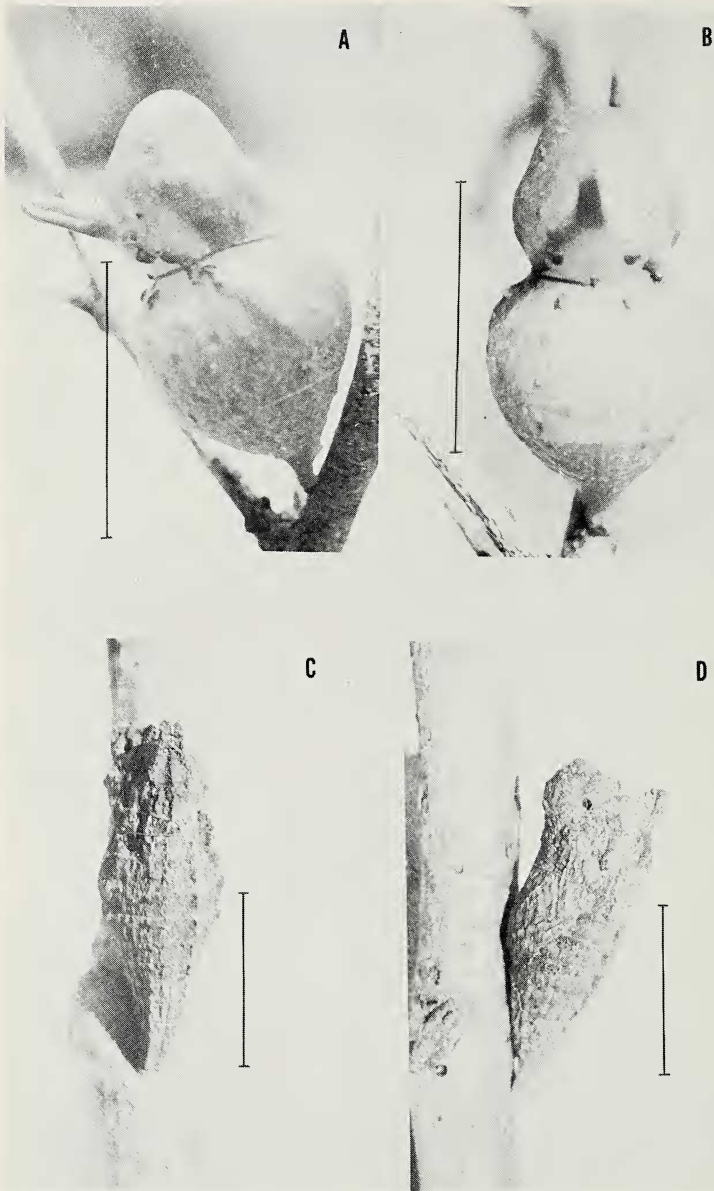


Fig. 4. Chrysalides. A. *G. belesis*, lateral view. B. *G. belesis*, ventral view. C. *G. e. epidaus*, ventral view. D. *G. e. epidaus*, lateral view. Photographs by R. F. Andrie.

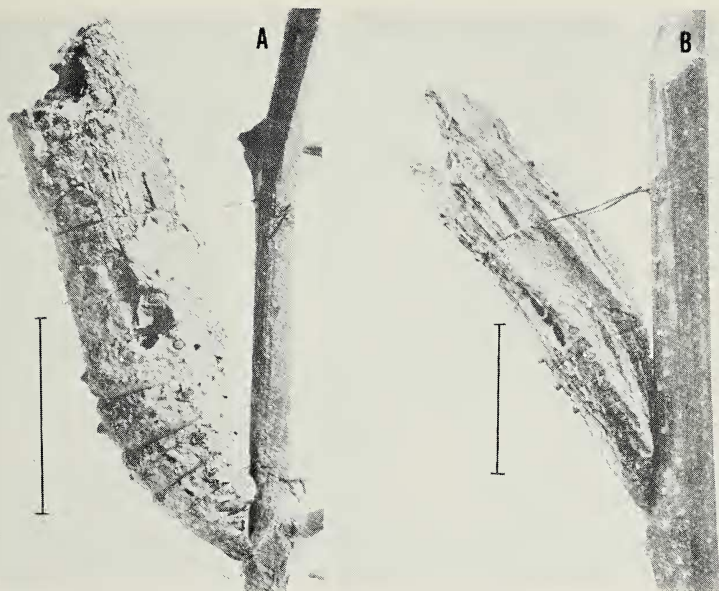


Fig. 5. Chrysalides. A. *P. anchisiades idaeus*. B. *P. androgeus epidaurus*. Photographs by R. F. Andrie.

LITERATURE CITED

- BATES, H. 1861. Contributions to an Insect Fauna of the Amazon Valley. Papilionidae. *Jour. Ent.* 1: 218-245.
- BURMEISTER, H. 1879. Lepidopteres. *Atlas de la Description Physique de la Republique Argentine Contenant des vues Pittoresques et des Figures d'Histoire Naturelle.* 5 (2): 4.
- CARACCILO, H. 1891. Notes and News. *Ent. News* 2: 51-55.
- COMSTOCK, J. and L. VAZQUEZ GARCIA. 1960. Estudios de los Ciclos Biologicos en Lepidopteros Mexicanos. *An. Inst. Biol. Mex.* XXXI (1&2): 339-448.
- DYAR, H. 1912. Descriptions of the larvae of some Lepidoptera from Mexico. *Proc. Ent. Soc. Wash.* 14: 54-58.
- DEWITZ, H. 1878. Entwicklung einiger Venezuelanischer Schmetterlinge nach Beobachtungen von Gollmer. *Archiv. fur Naturgesch.* 44: 1-36.
- EHRlich, P. and A. H. 1961. *How to know the Butterflies.* Dubuque, Iowa: Brown, 262 pp.
- HOFFMAN, C. 1940 Catalogo Sistemático y Zoogeográfico de los Lepidopteros Mexicanos. *An. Inst. Biol. Mex.* 11 (2): 639-739.
- JONES, E. 1882. Metamorphoses of Lepidoptera from San Paulo, Brazil. The Nomenclature and Description of New Forms. *Proc. Lit. Philos. Soc. Liverpool.* 36: 327-377.
- MERIAN, M. 1705. *Histoire Generale des Insectes de Surinam et de Toute L'Europe.* Vol. 1. *Des Plantes de Surinam.* Amsterdam, 72 pp.
- MOSS, A. M. 1919. The Papilios of Para. *Novitat. Zoolog.* 26: 259-319.
- SEPP, C. 1855. Papillons de Surinam. *Natuurlijke Historie van Surinaamsche Vlinders.* Vol. 3. Amsterdam, 328 pp.
- STOLL, C. 1781. IN Pieter Cramer *De Uitlandsche Kapellen Voorkomende in de Drie Waereld-Deelen Asia, Africa, en America.* Supplement 3. Amsterdam, 384 pp.